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EXAMINER	
JONES, ERIC W	

ART UNIT	PAPER NUMBER
2892	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/577,442	SUGITA ET AL.	
	Examiner	Art Unit	
	ERIC W. JONES	2892	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/13/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 11 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 11 and 21 state the pickup is carried out without expanding the pressure sensitive adhesive tape for dicing in the pickup step. The method of claim 1 has a pressure sensitive adhesive tape expansion step in the pickup step.

For examination purposes, Examiner interprets claims 11 and 21 to read the pickup is carried out with expanding the pressure sensitive adhesive tape for dicing in the pickup step.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-3, 5-9, 11, 13, 15-19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuoka et al (JP 03-085714 A1-machine translation provided) in view of Kawate et al (US 2005/0224978 A1).

Re claim 1, Fukuoka et al disclose a method for manufacturing a semiconductor chip, which comprises a tape adhesion step of sticking a pressure sensitive adhesive tape (12 in Drawing 2) for dicing having a pressure sensitive adhesive layer containing a gas generating agent for generating a gas by radiating light to a semiconductor wafer (W in Drawing 1) with a circuit formed; a dicing step for dicing the wafer with the pressure sensitive adhesive tape for dicing stuck and dividing the semiconductor wafer into each semiconductor chip (C in Drawing 1); a separation step of separating at least a portion of the pressure sensitive adhesive tape for dicing from the semiconductor chip by radiating light to the divided each semiconductor chip. (page 4, lines 17-37; page 10, lines 30-32; page 11, lines 31-37 and page 12, lines 1-9)

Fukuoka et al fail to disclose a pickup step of picking the semiconductor chip up

by a needle-less pickup method.

Kawate et al discloses needle-less pick-up of diced chips. (page 15, ¶ [0201])

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the needle-less pick-up of Kawate et al to the teachings of Fukuoka et al to produce diced wafer chips without damage due to pick-up. (page 15, ¶ [0202])

Re claim 2, Fukuoka et al in view of Kawate et al discloses all of the limitations of claim 1.

Fukuoka et al disclose the pressure sensitive adhesive tape for dicing is stuck to the face with the circuit formed of the semiconductor wafer in the tape adhesion step. (see Drawings 1 and 2; page 4, lines 17-25)

Re claims 3 and 13, Fukuoka et al in view of Kawate et al discloses all of the limitations of claim 1.

Fukuoka et al in view of Kawate et al fails to disclose an ultraviolet ray having radiation intensity of 500 mW/cm^2 or higher is radiated in the separation step.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an ultraviolet ray having radiation intensity of 500 mW/cm^2 or higher in the separation step, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233. See MPEP § 2144.05.

Fukuoka et al in view of Kawate et al also fails to disclose an ultraviolet ray at

wavelength of 365 nm is radiated in the separation step.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an ultraviolet ray at wavelength of 365 nm in the separation step, since Fukuoka et al disclose the use of ultraviolet light, and ultraviolet light ranges from 10-400 nm. Therefore, Fukuoka's UV light would include 365 nm.

Re claims 5 and 15, Fukuoka et al in view of Kawate et al discloses all of the limitations of claim 1.

Fukuoka et al disclose light emitted from a light source (50 in Drawing 11) is led to the pressure sensitive adhesive tape for dicing stuck to each semiconductor chip in the separation step. (page 11, lines 31-37 and page 12, lines 1-9)

Re claims 6 and 16, Fukuoka et al in view of Kawate et al discloses all of the limitations of claim 1.

Fukuoka et al in view of Kawate et al also fails to disclose radiation intensity X (mW/cm^2) of the ultraviolet ray radiated to an aimed semiconductor chip and a ratio Y_3 (%) of surface area of the aimed semiconductor chip exposed previously to an ultraviolet ray when the ultraviolet ray being radiated to another semiconductor chip satisfy the relationship represented by the following formula: $Y_3 \leq 0.013X + 46.5$, ($Y_3 \leq 95$).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an ultraviolet ray having radiation intensity X (mW/cm^2) of the ultraviolet ray radiated to an aimed semiconductor chip and a ratio Y_3 (%) of surface area of the aimed semiconductor chip exposed previously to an ultraviolet ray when the

ultraviolet ray being radiated to another semiconductor chip satisfy the relationship represented by the following formula: $Y_3 \leq 0.013X + 46.5$, ($Y_3 \leq 95$), since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233. See MPEP § 2144.05.

Re claims 7 and 17, Fukuoka et al in view of Kawate et al discloses all of the limitations of claim 1.

Fukuoka et al in view of Kawate et al also fails to disclose the light radiated to the entire face of the semiconductor chip has radiation intensity having a fluctuation range within 20% of the average radiation intensity.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use light radiated to the entire face of the semiconductor chip has radiation intensity having a fluctuation range within 20% of the average radiation intensity, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233. See MPEP § 2144.05.

Re claims 8 and 18, 9 and 19, Fukuoka et al in view of Kawate et al discloses all of the limitations of claim 1.

Fukuoka et al in view of Kawate et al also fails to disclose the light radiated to the semiconductor chip has the average radiation intensity in the inner portion of 5 to 30% of the adhesive face widened concentrically or rectangularly from the center position of the semiconductor chip in the entire adhesion surface area of the semiconductor chip

being 40 to 70% and 150 to 250% of the intensity to the average value of the radiation intensity in the portion other than the inner portion of the adhesive face.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use light radiated to the semiconductor chip having the average radiation intensity in the inner portion of 5 to 30% of the adhesive face widened concentrically or rectangularly from the center position of the semiconductor chip in the entire adhesion surface area of the semiconductor chip being 40 to 70% and 150 to 250% of the intensity to the average value of the radiation intensity in the portion other than the inner portion of the adhesive face, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233. See MPEP § 2144.05.

Re claims 11 and 21, Fukuoka et al in view of Kawate et al discloses all of the limitations of claim 1.

Fukuoka et al disclose reducing the adhesive power of the pressure sensitive adhesive (12 in Drawing 2) due to gas generation by ultraviolet irradiation prior to chip pickup. (page 11, lines 31-37 and page 12, lines 1-9)

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuoka et al.

Re claim 12, Fukuoka et al disclose a method for separating a pressure sensitive adhesive tape (12 in Drawing 2) having a pressure sensitive adhesive layer containing a gas generating agent for generating a gas by radiating light (ultraviolet) from a

semiconductor wafer (W in Drawing 1) or a semiconductor chip (C in Drawing 1) with the pressure sensitive adhesive tape stuck. (page 4, lines 17-37; page 10, lines 30-32; page 11, lines 31-37 and page 12, lines 1-9)

Fukuoka et al fail to disclose radiation intensity X (mW/cm^2; X is within 500 to 10,000 mW/cm^2) of an ultraviolet ray.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an ultraviolet ray having radiation intensity of 500 to 10,000 mW/cm^2, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233. See MPEP § 2144.05.

Fukuoka et al also fail to disclose radiation with wavelength of 365 nm radiated to a semiconductor wafer or a semiconductor chip stuck to the pressure sensitive adhesive tape.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use ultraviolet radiation with wavelength of 365 nm radiated to a semiconductor wafer or a semiconductor chip stuck to the pressure sensitive adhesive tape, since Fukuoka et al disclose the use of ultraviolet light, and ultraviolet light ranges from 10-400 nm. Therefore, Fukuoka's UV light would include 365 nm.

Fukuoka et al also fail to disclose a ratio Y3 (%) of the surface area of the semiconductor chip exposed to an ultraviolet ray before the ultraviolet ray being radiated satisfy the relationship represented by the following formula: $Y_3 \leq 0.013X + 46.5$, ($Y_3 \leq 95$).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a ratio Y_3 (%) of surface area of the semiconductor chip exposed to an ultraviolet ray before the ultraviolet ray being radiated satisfy the relationship represented by the following formula: $Y_3 \leq 0.013X + 46.5$, ($Y_3 \leq 95$), since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233. See MPEP § 2144.05.

8. Claims 4 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuoka et al and of Kawate et al as applied to claim 1 above, and further in view of Kurosawa et al (US 2007/0197002 A1).

The teachings Fukuoka et al and Kawate et al have been discussed above.

Re claims 4 and 14, Fukuoka et al in view of Kawate et al discloses all of the limitations of claim 1.

Fukuoka et al disclose light is radiated immediately before the semiconductor chip is separated. (page 12, lines 1-9)

Fukuoka et al in view of Kawate et al fails to disclose the semiconductor chip is aspirated by an aspiration means in the separation step.

Kurosawa et al disclose separation of semiconductor chips (1 in FIG. 47A) from adhesive tape by suction of a suction collet (10 in FIG. 47A). (page 10, ¶ [0180])

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the suction separation of chips of Kurosawa et al to the teachings of Fukuoka et al and Kawate et al to prevent damage to semiconductor chips

during pickup, contributing to an improvement in manufacturing yield. (page 11, ¶ [0185])

9. Claims 10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuoka et al and Kawate et al as applied to claim 1 above, and further in view of Nakazawa et al (US 2002/0019074 A1).

The teachings Fukuoka et al and Kawate et al have been discussed above.

Re claims 10 and 20, Fukuoka et al in view of Kawate et al discloses all of the limitations of claim 1.

Fukuoka et al in view of Kawate et al fails to disclose the separation step is carried out in an inert gas.

Nakazawa et al disclose peeling chips from a semiconductor wafer from adhesive tape by blowing an inert gas. (page 2, ¶ [0016])

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the inert gas atmosphere of Nakazawa et al to the teachings of Fukuoka et al and Kawate et al to improve device chip separation, producing device chips without cracks, and having enhanced quality. (page 6, ¶ [0082])

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC W. JONES whose telephone number is (571)270-3416. The examiner can normally be reached on Monday-Friday 5:30AM-3:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thao X. Le can be reached on (571)272-1708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ERIC W JONES/
Examiner, Art Unit 2892
3/25/2008

/Thao X Le/
Supervisory Patent Examiner, Art Unit 2892

1.